trionalis; *borealis*, Bohem.*, with "setis mystacinis utrinque pluribus .... Thorax lineolis sub-quinis fuscis. Abdomen cinereum .... segmentis margine apicali anguste pallidis," is probably, as indicated in Kertesz's 'Katalog,' a synonym of *modesta*, Mg. Finally, *maculipennis*, Becker, is distinguished primarily by the strongly infuscated middle cross-vein.

X.—*New* Sarcophagidæ *from Asia, with Data relating to the* dux *Group* †. By R. R. PARKER, Bozeman, Montana.

DR. G. BÖTTCHER, writing in 1912 (1, pp. 735–736), considered *Sarcophaga tuberosa*, Pandellé, *S. harpax*, and *S. exuberans*, Pand., to be varieties of *S. tuberosa*. In previous papers the writer has followed this practice, treating these and other related forms, more recently described, first as subspecies of *S. tuberosa* and later as subspecies of *S. dux*, Thomson (2). This grouping has been due to the similar structure of the genital apparatus, especially of the penes, and the constant occurrence of a certain group of external characters in all these species. Furthermore, the grouping has seemed advisable as an indication of relationship. Including the three new forms described in this paper, the number of recognized members of the group is ten, each added member indicating more strongly the really specific value of the differentiating external characters. In future, therefore, the writer believes these forms should be recognized as distinct species belonging to a group within the genus. This group should be known as the *dux*-group, *S. dux* being the first described member.

In his last paper dealing with this group (2) the writer designated two forms as "subspecies *a*" and "subspecies *b*" respectively—the one being *S. shermani*, sp. n., herein described, and the other *S. exuberans*. Which name belonged to which species could not be stated, because of reasons then noted. It is now possible, however, to make the above designations, thanks to Dr. J. Villeneuve, who kindly forwarded a specimen of *exuberans*, which he had compared with Pandellé's type. It was further apparent that a

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* This species was first described by Boheman in 1865 (Öfv. K. Vet.-Akad. Förh. Stockholm, xxii. p. 573), and not, as given in Kertesz's 'Katalog,' by Holmgren in 1872.

† Contribution from the Entomological Laboratory of the Montana State College, Bozeman, Montana.

European specimen in my collection which I had thought to be the same as "subspecies *a*" (*shermani*) was in reality undescribed, and is herein given the name *S. marshalli*, sp. n.

Sarcophaga shermani, sp. n.

Holotype (male), collection of R. R. Parker.
Allotype (female), collection of R. R. Parker.
Length 11–14 mm.

Male.—Three rows of black cilia behind eyes; cheek-vestiture black; anterior profile outline of forceps-prong gently sinuate near tip; the two pairs of distal processes of penis very slender (longer and more slender than in any other known species of the group); posterior spur-like projection of the distal sclerite of penis very prominent (largest and longest of any species of the group); first genital segment usually brownish, sometimes brownish posteriorly shading into dull orange anteriorly, less commonly dull orange throughout; second genital segment dull orange. For illustration of genitalia, see 2 (p. 45, figs. 6 & 13), and for separation of *shermani* and *sarracenoides*, Aldrich, see 2 (p. 42).

Female.—The female presents no characters which permit an accurate separation from that of *sarracenoides*, though knowledge of the locality of collection will often make identification reasonably certain.

Described from fifteen male and three female specimens.

CANADA: Savary Island, British Columbia, 5. vii. and 12. viii. 1918 (*R. S. Sherman*); Ottawa, Ontario, 25. v. 1896; Kentville, Nova Scotia, 7. viii. 1914 (*C. R. G.*); Boule River Camp, Riordan Limits, N.S., 31. vii. 1910 (*C. ? H.*). UNITED STATES: Lunenburg, Mass., 14. vi. 1914 (*R. T. Webber*); Magdalena, New Mexico; Northport, Mich., viii. 1903 (*Will Bailey*); Berkeley, Calif., 18. v. 1915 (*M. C. Van Duzee*); Redwood Canyon, Alameda Co., Cal., 29. v. 1915; Gallatin Mts., Mont., 30. vi. 1914 (*R. R. Parker*).

A specimen taken on Savary Island on 12th Aug., 1918, by R. H. Sherman, in whose honour the species is named, is the holotype.

The specimen taken at Magdalena, New Mexico, lacks prescutellar acrostichal bristles, but this is possibly an individual variation.

Sarcophaga exuberans, the form previously designated "subspecies *b*" (2), may easily be separated from both *shermani* and *sarracenoides* by the presence of but two rows of black cilia behind the eyes and of white vestiture on the posterior portion of the cheek. *S.* ***exuberans*** is also smaller and less robust than these other two species. It is less easily separated from *craggi* (see paragraph following description of *craggi*).

Sarcophaga ceylonensis, sp. n.

Holotype (male), collection of R. R. Parker.
Allotype (female), collection of R. R. Parker.
Length 8–11½ mm.

The characters of the penis at once place this species in the *dux*-group, and it is then separated from the other members of the group by the following characters:—One row of black cilia behind eyes; cheek-vestiture white (few anteriormost hairs may be black); fourth abdominal notum with at least posterior margin dull orange; in profile basal portion of fifth ventral plate presents a straight line (not raised posteriorly); forceps-prong sinuate at tip (not toothed); both genital segments dull orange. In the female the above characters (other than sexual) hold good, except that fourth notum is not dull orange posteriorly; the fifth notum is typically *dux*-shaped (fig. 1).

Fig. 1.

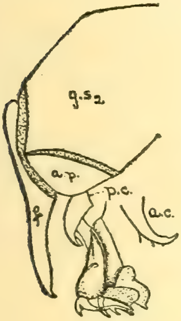

Fig. 2.

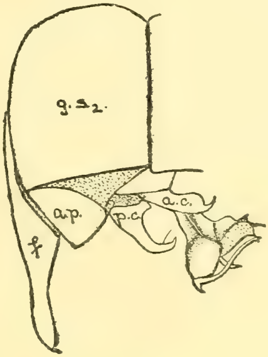

Fig. 1.—*Sarcophaga ceylonensis*, sp. n., male genitalia.
Fig. 2.—*Sarcophaga craggi*, sp. n., ,, ,,

Described from nineteen male and twenty-one female specimens.

CEYLON: Peradenyia, 28. vii. 1920 (*J. C. Hutson*); Colombo, 29. xii. 1914 (record No. 3936). INDIA: Guindy, Madras (*J. Cragg*); Coimbatore, 9. x. 1913 (*T. B. Fletcher*). MALAY PENINSULA: Singapore (*Bryant & Palmer*).

The specimens from Peradenyia, Ceylon, were reared from a dead snail, *Achatina fulica*, and a single specimen from Colombo is recorded as having a "sheep" for its "host." The specimen from Coimbatore is labelled "from a dead snake."

Sarcophaga craggi, sp. n.

Holotype (male), collection of R. R. Parker.

Allotype (female), collection of R. R. Parker.

Length 9–12 mm.

The male of this species is differentiated from its near relatives by the following characters:—Two rows of black cilia behind eyes; cheek-vestiture white, except that of most anterior portion; in profile basal portion of fifth ventral plate presents a straight line (not "humped" posteriorly); forceps-prong toothed at tip (fig. 2, *f.*); claspers specific (*a.c.* and *p.c.*); penis; first genital segment brownish or blackish, pollinose, second segment dull orange. In the female the above characters (other than sexual) hold good, except the colour of the genital segments; these are dull orange throughout.

Described from five male and two female specimens.

INDIA: Guindy, Madras. NYASALAND: Blantyre, 30. iii. 1914 (*Dr. J. B. Davey*). LIBERIA: Mt. Coffee, iv. 1897 (*R. P. Currie*).

The holotype is from India; the allotype from Nyasaland.

S. craggi can be easily confused with *exuberans*, and separation can only be safely made from the characters of the forceps and claspers. The specimens from Nyasaland are labelled "from pupa."

This species is named in honour of Major F. W. Cragg.

Sarcophaga marshalli, sp. n.

Holotype (male), collection of R. R. Parker.

The following characters serve to distinguish *marshalli* from its group-relatives:—Three rows of black cilia behind eyes; cheek-vestiture black; middle femur without "comb"; in profile basal portion of fifth ventral plate presents a straight line (not "humped" posteriorly); forceps-prong scarcely toothed at tip, in profile the anterior and posterior edges parallel for a short distance back of tip (fig. 3, *f*); claspers and penis specific (*p.c.*); first genital segment dark brownish or blackish, pollinose, second genital segment dull orange.

Described from one male specimen.

EUROPE: the holotype bears the following label—"S. vito d. Norm.," 31. v. 1905.

This species is named in honour of Dr. G. A. K. Marshall of the Imperial Bureau of Entomology, and the holotype is the specimen mentioned by the writer (2, p. 42) as received from Dr. Bezzi, and at that time thought to be the same as *shermani.*

Sarcophaga hutsoni, sp. n.

Holotype (male), collection of R. R. Parker.

Allotype (female), collection of R. R. Parker.

Male.—Length 8–9½ mm. Two rows of black cilia behind eyes; vestiture of anterior portion of cheek black, of posterior portion white; frontals extending well below base of vitta; section iii. of costa longer than section v.; leg-vestiture short; posterior face of hind femur without ventral bristles; anterior acrostichals absent, four or more pairs of posterior dorsc-centrals, only posterior two strong; vestiture of fourth ventral plate short and appressed; first genital segment without marginal bristles, second dull orange.

Head.—Viewed from front, parafrontals and genæ silvery-grey. Breadth of front at narrowest part about two-fifths eye-width; cheek-height about one-third that of eye. At its narrowest part, frontal vitta about twice width of each parafrontal, its sides not parallel. Second antennal segment dark; third about twice length of second; arista long, plumose to beyond middle. Two rows of black cilia behind eyes, otherwise vestiture of back of head white. Vestiture of anterior portion of cheek black, that of posterior portion white. Gena with row of hairs near lower eye-orbit, otherwise bare. Palpi dark.

Chætotaxy.—Lateral verticals absent; vibrissæ inserted slightly above line of oral margin; each row of frontals extending beyond base of vitta, usually with eleven to thirteen bristles, lower end scarcely divergent from inner edge of gena.

Thorax.—Mesonotum clothed with short reclinate bristles. Epaulettes black.

Wings.—Bend of fourth vein a right angle or slightly less; anterior cross-vein more basal than end of first longitudinal; third vein with bristles; section iii. of costa longer than section v.; costal spine vestigial; calyptera whitish.

Legs.—Dark, vestiture short. Anterior face of posterior femur usually with three rows of bristles, those of intermediate row few in number and sometimes almost lacking; posterior face without lower row of bristles; tibia straight; tarsus not shorter than tibia. Anterior and posterior ventral rows of bristles of middle femur present, former with only scattered bristles proximally, latter present on distal half only; submesotibial bristle present, anterior face of tibia with but a single bristle close to median dorsal ridge.

Chætotaxy.—Anterior dorso-centrals about twice length of vestiture of prescutum; acrostichals absent; inner presuturals present; four or more pairs of posterior dorso-centrals, only posterior two strong; prescutellar acrostichals present; scutellar apicals present; three sterno-pleurals; lower sterno-pleura with bristles only.

Abdomen.—Clothed above with short reclinate bristles, beneath with somewhat longer, almost erect hairs. Vestiture of fourth ventral plate short and appressed.

Chætotaxy.—Second segment without dorsal marginal bristles; third with two dorsal marginals and usually with two pairs of laterals.

Genital Segments.—First segment dark, without marginal bristles; second segment dull orange. Forceps (fig. 4, *f.*) darker than second segment, in profile anterior and posterior edges parallel on distal third, tip slightly curved forward with an angular tooth at extremity, prongs approximated for slightly more than basal half. Structure of penis very similar to that of *S. fuscicauda*, Böttcher.

Female.—Differs from male in following essential characters:—Breadth of front at narrowest part two-thirds eye-width; cheek-height about one-fourth that of eye; at its narrowest part frontal vitta scarcely wider than width of each parafrontal; row of hairs on gena near eye extends up on to parafrontal; vestiture of abdomen of short reclinate bristles except that that of ventral surface of fourth notum is erect and hairy; fifth abdominal notum (first genital) of same colour and pollinosity as those preceding; third abdominal notum dorsally and laterally with complete or nearly complete row of marginal bristles.

Described from six male and six female specimens.

Ceylon: Peradenyia, 1. viii. 1919 (*J. C. Hutson*). South India: Guindy, Madras, 18. iii. 1915 (*C. K. S.*).

Nine of the twelve specimens were taken from *Aristolochia* sp., at Peradenyia, Ceylon, and from the appearance of the specimens they seem to have been reared (record no. 4426). Two specimens from South India are labelled "Par. on grasshopper, on cumbu" (collection of Imperial Bureau of Entomology).

This species is close to *S. fuscicauda*, Böttcher. However, it had two rather than three rows of black cilia behind the eyes. The forceps are essentially alike and the penes quite similar. The fifth abdominal notum in the female of *hutsoni* is folded on the middle point of the posterior margin, so that the edges on either side of this point are either approximated along the median ventral line or are nearly so and parallel. This closely resembles the condition in *fuscicauda*, except that in the latter there are two points of fold, slightly separated, so that, while the two edges posterior to the points of fold are essentially parallel, they are normally separated and not approximated.

Both holotype and allotype were selected from the specimens taken from *Aristolochia*.

The species is named in honour of Mr. J. C. Hutson, Entomologist for Ceylon.

Fig. 3.

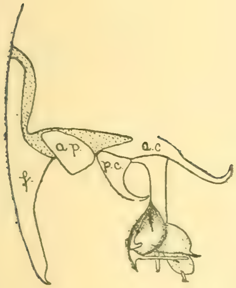

Fig. 4.

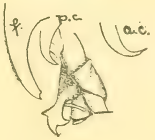

Fig. 3.—*Sarcophaga marshalli.* sp. n., male genitalia.
Fig. 4.—*Sarcophaga hutsoni*, sp. n., " "

Abbreviations in figs. 1–4:—*a.c.*, anterior claspers; *p.c.*, posterior claspers; *a.p.*, accessory plate; *g.s.* 2, second genital segment; *f.*, forceps.

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(1) G. Böttcher. "Die männlichen Begattungswerkzeuge bei dem Genus *Sarcophaga*, Meig., und ihre Bedeutung für die Abgrenzung der Arten." Deutsche Entomologische Zeitschrift, 1912, Heft 5, pp. 525–544; Heft 6, pp. 705–736; 1913, Heft 1, pp. 1–16; Heft 2, pp. 15–130; Heft 3, pp. 239–254; Heft 4, pp. 351–377.

(2) R. R. Parker. "Concerning the Subspecies of *Sarcophaga dux*, Thomson." Bulletin Brooklyn Entomological Society, vol. xiv. no. 2, Apr. 1919, pp. 41–46.